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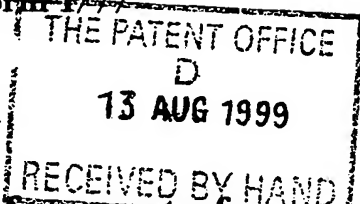


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Dated 17 October 2003

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Request for grant of a patent

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The Patent Office

Cardiff Road
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1. Your reference

MSP 587

2. Patent application number

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13 AUG 1999

9919074.6

3. Full name, address and postcode of the or of each applicant (underline all surnames)

**DOW CORNING CORPORATION
Midland, Michigan 48611, USA**

Patents ADP number (if you know it)

414029003

X 614029001 ✓

If the applicant is a corporate body, give the country/state of its incorporation

Michigan, USA

4. Title of the invention

COATING COMPOSITIONS AND TEXTILE FABRICS COATED THEREWITH

5. Name of your agent (if you have one)

Dr. L.J.R. Vandamme

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

**DOW CORNING LIMITED
Intellectual Property Department
Cardiff Road
Barry CF63 2YL**

Patents ADP number (if you know it)

3749488002

134674002

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

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Date of filing
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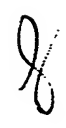
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- a) any applicant named in part 3 is not an inventor, or
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Claim(s)	5	
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Statement of inventorship and right to grant of a patent (*Patents Form 7/77*)

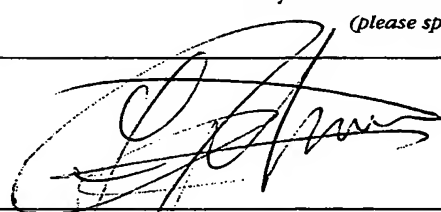
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11.  I/We request the grant of a patent on the basis of this application.

Signature

Date 12.08.99

Dr. L.J.R. Vandamme

12. Name and daytime telephone number of person to contact in the United Kingdom

Dr. L.J.R. Vandamme
(01446) 723860

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COATING COMPOSITIONS AND TEXTILE FABRICS COATED THEREWITH

The present invention relates to a coating composition for textile fabrics and to textile fabrics coated with such compositions, and in particular to a fabric coated with a silicone-based coating composition capable of maintaining a pressure barrier between two areas with a pressure differential. The invention also relates to a process of preparing such textile fabrics and to airbags made with coated fabrics.

Coating compositions for textile substrates, which provide a flexible coat on the fabric, e.g. to decrease permeability of the fabric or to improve thermal protection of the fabric are well known in the art, and are described in many patent specifications, such as those referred to below. The present invention is particularly concerned with coating compositions which give a silicone-based elastomeric finish. It is traditionally required to use an adhesion promoter in such compositions to ensure good adhesion to the fabric and to maintain a good shelf life of the coated textile fabric.

There is a desire to provide coating compositions for textile fabrics which require a lower amount of adhesion promoter, or ideally which do not require any adhesion promoter, to provide stable coated fabrics with improved longevity.

Coating textile fabrics with silicone-based coating compositions has been known for a while. These compositions may impart a variety of benefits to the coated fabric. For example in EP 553,840, there is described a liquid silicone rubber coating composition for application to airbags in automobiles, which comprises a certain polydiorganosiloxane having alkenyl groups, an polyorganosiloxane resin, an inorganic filler, a certain

polyorganohydrosiloxane, a platinum group metal catalyst and an epoxy group-containing organosilicon compound. In EP 646,672, there is described a fabric impregnated with a silicone composition comprising a certain linear

5 polyorganosiloxane having aliphatic unsaturation, a certain polyorganohydrosiloxane, a catalyst promoting addition reaction, a hydrophobic silica, a flame retardant and optionally an adhesion promoting agent. The latter patent specification suggests the use of the composition
10 for fabrics used in the construction of airbags. The benefit of using silicone-coated compositions over other, e.g. organic coating compositions, lies e.g. in the improved weatherability, ability to maintain flexibility and heat resistance of the silicone-based composition.

15 While fabrics coated with such compositions may be satisfactory for airbag applications, they do not satisfy requirements where pressurised fluids are to be retained in a fabric envelope for a relatively long period. This requirement exists for example in the application of such
20 coatings to side curtain airbags for the automotive industry. These side curtain airbags are intended to inflate at the time of impact, as do conventional airbags. The side curtains unfold to form a cushioned curtain between passengers and some of the side of the car body,
25 e.g., the windows. As the intention is not merely to cushion the blow on impact itself, as is the case for conventional driver and passenger airbags, but e.g. to protect passengers when a car is rolling, it is important that the side curtain air bag is sufficiently pressurised
30 during such rolling process. Where conventional driver and passenger airbags only need to retain pressure for a fraction of a second, it is desirable that side curtain airbags maintain a suitable pressure for a few seconds. Similar applications exist where a pressurised fabric

structure is desired to maintain a certain fluid pressure for a relatively extended period of time, e.g. in emergency chutes for aeroplanes, inflatable rafts etc.

In EP 886164, there is provided a coated textile
5 fabric comprising a textile fabric, having at least two layers of an polyorganosiloxane-based elastomeric material, characterised in that the first layer is coated onto the fabric and has an elongation-at-break of at least 400% and in that the second layer has a tear-strength of
10 at least 30kN/m.

However the solution provided in the above patent specification requires the application of 2 coats onto a fabric substrate. This causes additional work and cost to the manufacturing process and may provide a final coating
15 of fairly high coat weight. There is a need to provide coatings which will also perform well in the side curtain applications, but which require only a single coat and still provide good performance, preferably at lower coat weight.

20 We have found that a combination of certain silicone-based components in coating compositions can provide these benefits. It has been surprisingly found that such compositions do not need any adhesion promoters to ensure good adhesion to textile fabrics. It has also been found
25 that the coated fabrics according to the present invention are beneficial in standard airbags and other inflatable safety restraint devices. In particular, we have found that applying a single layer of a silicone-based coating composition, wherein a combination of 3 different types of
30 organopolysiloxane ingredients having aliphatically unsaturated hydrocarbon or hydrocarbonoxy substituents is very beneficial for such purpose.

According to a first aspect of the invention, there is provided a coating composition for textile fabrics,

which is curable to an elastomeric finish, which comprises a first, second and third organopolysiloxane having aliphatically unsaturated hydrocarbon or hydrocarbonoxy substituents, an organosilicon crosslinker having at least
5 3 silicon-bonded hydrogen atoms, a catalyst able to promote the reaction of the aliphacally unsaturated hydrocarbon or hydrocarbonoxy substituents with Si-H groups and a reinforcing filler, wherein the first and second organopolysiloxanes have aliphatically unsaturated
10 hydrocarbon or hydrocarbonoxy substituents only at the terminal siloxane units, the first organopolysiloxane having a viscosity at 25°C of from 50 to 650 mm²/s, the second organopolysiloxane having a viscosity at 25°C of at least 10,000 mm²/s and wherein the third organopolysiloxane
15 has aliphatically unsaturated hydrocarbon or hydrocarbonoxy substituents at terminal siloxane units and on siloxane units in the siloxane polymer chain.

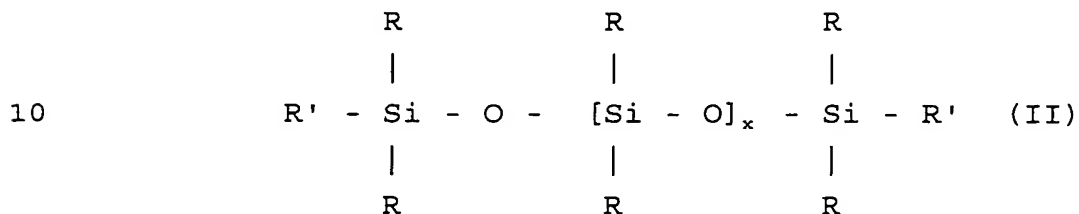
The word or concept of comprising, where used herein, includes is used in its widest sense to mean and to
20 encompass the notions of "include", "comprehend" and "consist of".

The coating composition comprises organopolysiloxanes which are able to cure to an elastomeric finish via an addition reaction. Such organopolysiloxane systems are
25 known and many are commercially available and have been described in the literature. Suitable elastomer-forming organopolysiloxanes systems comprise at least three types of an organopolysiloxane having aliphatic unsaturation in some of their hydrocarbon or hydrocarbonoxy substituents
30 and an organosilicon cross-linker having Si-H groups.

Useful organopolysiloxanes comprise units of the general formula $R_aR'_bSiO_{4-a-b/2}$ (I), wherein R is a monovalent hydrocarbon group having up to 18 carbon atoms, R' is a monovalent hydrocarbon or hydrocarbonoxy group having

aliphatic unsaturation, a and b have a value of from 0 to 3, the sum of a+b being no more than 3, provided the conditions outlined above for the organopolysiloxane materials are complied with.

- 5 Preferably the first and second organosiloxane polymers are of a generally linear nature having the general structure (II)

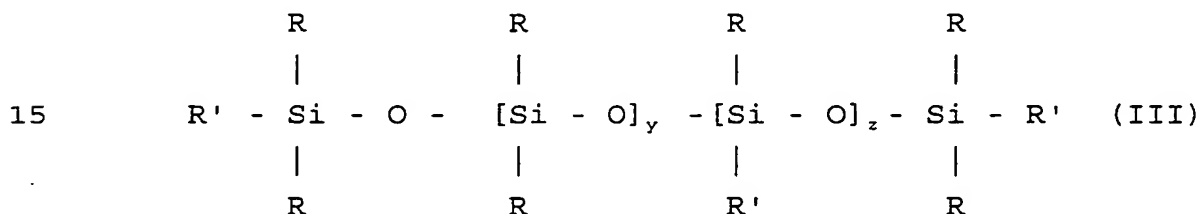


- wherein R and R' have the same meaning as above, and wherein x is an integer to allow the organopolysiloxane to
15 fulfil the requirements for the viscosity range, mentioned above, for example a value of up to 300, preferably from 75 to 250, more preferably 100 to 200 for the first organopolysiloxane and having a value of at least 300, preferably from 400 to 1000, more preferably 450 to 1000
20 for the second organopolysiloxane. It is particularly preferred that R denotes an alkyl or aryl group having from 1 to 8 carbon atoms, e.g. methyl, ethyl, propyl, isobutyl, hexyl, phenyl or octyl. More preferably at least 50% of all R groups are methyl groups, most
25 preferably substantially all R groups are methyl groups. R' is an aliphatically unsaturated hydrocarbon or hydrocarbonoxy group, preferably a hydrocarbon group having from 2 to 22 carbon atoms, more preferably 2 to 8 carbon atoms, most preferably 2 or 6 carbon atoms. It is
30 particularly preferred that the aliphatically unsaturated group is an alkenyl group, although alkynyl groups may also be used. Particularly useful are vinyl, allyl and hexenyl groups, most preferably having terminal unsaturation. It is most preferred that first

organopolysiloxane is an α,ω -vinyl dimethyl siloxy polydimethylsiloxane polymer having a viscosity of from 50 to 650 mm²/s at 25°C, more preferably 100 to 600 mm²/s, most preferably 300 to 600 mm²/s. It is also most

5 preferred that second organopolysiloxane is an α,ω -vinyl dimethyl siloxy polydimethylsiloxane polymer having a viscosity of from 10,000 to 90,000 mm²/s at 25°C, more preferably 20,000 to 80,000 mm²/s, most preferably 40,000 to 70,000 mm²/s.

10 Preferably the third organosiloxane polymer is also of a generally linear nature having the general structure (III)



wherein R and R' have the same meaning as above, and

wherein y is zero or an integer and z has a value of at

20 least 1. The value of y+z is no more than 300, preferably from 100 to 200, more preferably from 120 to 180. The value of z is preferably at least 2, more preferably from 2 to 20, most preferably 2 to 5. It is most preferred that third organopolysiloxane is an α,ω -

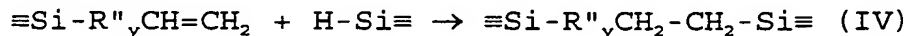
25 vinyl dimethyl siloxy polydimethylsiloxane

polymethylvinyl siloxy co-polymer having a viscosity of from 50 to 650 mm²/s at 25°C, more preferably 100 to 600 mm²/s, most preferably 300 to 600 mm²/s.

30 The relative amounts of first second and third organopolysiloxanes of the first aspect of the invention are not crucial, although it is preferred that the second organopolysiloxane is present in the largest amount. A factor which will influence the exact ratios is the viscosity of each of the organopolysiloxanes and the

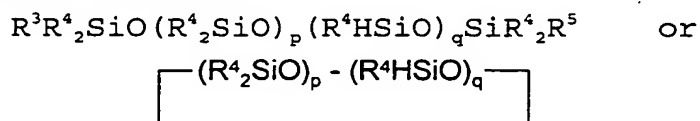
desired viscosity of the composition needed for coating the textile fabrics. It is preferred that this viscosity is sufficiently low to allow the use of standard coating equipment at normal temperatures. Suitable weight ratios of the first to second organopolysiloxanes are from 1 to 2 to 1 to 20, whilst suitable weight ratios of the second to third organopolysiloxanes are from 20 to 1 to 2 to 1. Particularly suitable weight ratio of first, second and third organopolysiloxanes are 1/2/1, 1/5/1, 2/10/1, 1/10/2, 5/10/1 and 2/5/1. It is preferred that first, second and third organopolysiloxanes combined comprise from 40 to 95% by weight of the elastomer-forming coating composition according to the first aspect of the invention, preferably from 50 to 85%, more preferably 60 to 80%.

Organosilicon cross-linkers for use in the elastomer-forming coating composition according to the invention are preferably selected from silanes, low molecular weight organosilicon resins and short chain organosiloxane polymers. The cross-linker compound has at least 3 silicon-bonded hydrogens which are capable of reacting with the silicon-bonded groups R' of the organopolysiloxane described above by addition reaction between the cross-linking organosilicon compound and the organopolysiloxane, for example according to the general reaction scheme (IV), wherein R" is a divalent hydrocarbon group and y is as defined above, preferably here with a value of 1.



A suitable silane which may serve as cross-linking organosilicon compound is methyltrihydrosilane. Suitable organosilicon resin compounds include organosilicon resins consisting mainly of tetrafunctional siloxane units of the formula $\text{SiO}_{4/2}$ and monofunctional units $\text{R}_x\text{H}_y\text{Si}_{1/2}$, wherein R

is as defined above, v and w each have a value of from 0 to 3, the sum of $v+w$ being 3. Suitable short chain organosiloxane polymers include those having at least 3 silicon-bonded hydrogen atoms per molecule and may be
 5 linear or cyclic. Preferred organosilicon cross-linkers have the general formula



wherein R^4 denotes an alkyl or aryl group having up to 10
 10 carbon atoms, R^3 is a group R^4 or a hydrogen atom, p has a value of from 0 to 20, q has a value of from 1 to 70, and there are at least 3 silicon-bonded hydrogen atoms present per molecule. It is not crucial but preferred that the silicon-bonded hydrogen atoms are on terminal silicon
 15 atoms for linear siloxane compounds. It is preferred that R^4 denotes a lower alkyl group having no more than 3 carbon atoms, most preferably a methyl group. R^3 preferably denotes an R^4 group. Preferably $p = 0$ and q has a value of from 2 to 70, more preferably 2 to 30, or where cyclic
 20 organosilicon materials are used, from 3 to 8. It is most preferred that the organosilicon crosslinker is a siloxane polymer having a viscosity of from 1 to 150 mm²/s at 25°C, more preferably 2 to 100 mm²/s, most preferably 5 to 60 mm²/s. The cross-linking organosilicon compound may
 25 comprise a mixture of several materials as described.

Examples of suitable organosilicon cross-linkers are trimethylsiloxane end-blocked polymethylhydrosiloxane having up to for example 20 carbon atoms, dimethylhydrosiloxane end-blocked methylhydro siloxane,
 30 dimethylsiloxane methylhydrosiloxane copolymer and tetramethylcyclotetrasiloxane. The size of the organosilicon crosslinker is not crucial, but preferred

are short chain organosiloxane polymers having at least three silicon-bonded hydrogen atoms, which have a chain length of from 2 to 50 silicon atoms, more preferably from 5 to 20. The amount of crosslinker used is preferred to
5 allow a ratio of number of silicon-bonded hydrogen atoms to aliphatically unsaturated hydrocarbon and hydrocarbonoxy groups in the elastomer-forming composition, which is at least 5/1, preferably from 5/1 to 10/1, most preferably 6/1 to 8/1.

10 In addition to the organopolysiloxanes and the organosilicon cross-linking compounds, the elastomer-forming compositions according the invention preferably also comprise a suitable catalyst, selected from those based on precious metals, particularly Group VIII metals,
15 including ruthenium, rhodium, palladium, osmium, iridium and platinum. Preferably the catalyst is a well-known platinum compound or complex. Suitable platinum compounds and complexes include chloroplatinic acid, platinum acetylacetonate, complexes of platinous halides with
20 unsaturated compounds such as ethylene, propylene, organovinylsiloxanes, and styrene, hexamethyldiplatinum, $PtCl_2$, $PtCl_3$, $PtCl_4$, and $Pt(CN)_3$. The preferred platinum catalyst is a form of chloroplatinic acid, either as the commonly available hexa-hydrate form or in its anhydrous
25 form, as taught in US patent 2,823,218. Another particularly useful catalyst is the composition that is obtained when chloroplatinic acid is reacted with an aliphatically unsaturated organosilicon compound such as divinyltetramethyl-disiloxane, as disclosed in US patent
30 3,419,593. It is preferred that the catalyst is employed in an amount giving from 2 to 100 ppm by weight of platinum metal based on the total weight of the total composition, more preferably 5 to 50ppm.

Another essential ingredient in the elastomer-forming coating composition according to the invention is a reinforcing filler. Suitable fillers include silica, e.g. fumed silica, precipitated silica, gel-formation silica, aerosils, titania and glass microspheres. Preferably the filler has a hydrophobic surface, which may be obtained by treating the filler, e.g. with suitable silanes, short chain siloxanes, fatty acids or resinous silicone materials. Suitable materials and processes for rendering the surface of fillers hydrophobic have been described in the literature, and are known to the person skilled in the art. The amount of reinforcing filler is again not crucial, but preferably from 10 to 50% by weight of the total elastomer forming composition consists of the filler, more preferably from 15 to 40%, most preferably 20 to 30%.

Other additional components may be included in suitable elastomer-forming compositions, including other fillers, chain extenders, dyes, adhesion promoters, colorants, pigments, viscosity modifiers, bath-life extenders, inhibitors and flexibilisers. Suitable other fillers include ground quartz, ground cured silicone rubber particles and calcium carbonate. Preferably these fillers have been treated to make their surface hydrophobic where necessary as described above. Adhesion promoters include epoxy-functional, organotitanates or amino-functional organosilicon compounds. Chain extenders are preferably not used, but where they are used, they tend to be organosiloxane materials which are predominantly linear in nature and which have a silicon-bonded hydrogen at each end of the polymer, allowing it to react with the R' group of siloxane polymers, this merely extending the length of the siloxane polymer.

The coating composition is preferably a composition which comprises

- (a) 100 parts by weight of a first organopolysiloxane material having only terminal silicon-bonded aliphatically unsaturated hydrocarbon groups per molecule and a viscosity at 25°C of from 50 to 650 mm²/s;
- (b) from 300 to 700 parts by weight of a second organopolysiloxane material having only terminal silicon-bonded aliphatically unsaturated hydrocarbon groups per molecule and a viscosity at 25°C of at least 10,000 mm²/s;
- (c) from 50 to 150 parts by weight of a third organopolysiloxane material having has aliphatically unsaturated hydrocarbon substituents at terminal siloxane units and on units in the polymer chain per molecule;
- (d) an organosilicon compound having at least three silicon-bonded hydrogen atoms per molecule, in an amount which is sufficient to give a molar ratio of Si-H groups in (d) to alkenyl groups in (a), (b) and (c) combined of from 5/1 to 10/1;
- (e) a group VIII based catalyst component in sufficient amounts to catalyse the addition reaction between (a), (b) and (c) on the one hand and (d) on the other;
- (e) from 100 to 400 parts by weight of a hydrophobic filler.

The elastomer-forming coating composition may be prepared by merely mixing the ingredients in the desired ratios. However, for reasons of storage stability and bath life before or during application of the compositions to the textile fabric, it is preferred to store the composition in two parts, by separating the catalyst (d) from the organosilicon cross-linker. The other components of the compositions are often distributed over both parts in proportions which will allow easy mixing of the two

parts immediately prior to application. Such easy mixing ratios may be e.g. 1/10 or 1/1 ratios.

According to a second aspect of the invention there is provided a coated textile fabric comprising a textile
5 fabric coated with an elastomer-forming composition according to the first aspect of the invention, which has been allowed to cure to an elastomeric finish.

Suitable fabrics for use in the present invention may be made from synthetic fibres or blends of natural and
10 synthetic fibres, and include polyester, polyimides, polyethylene, polypropylene, polyester-cotton, glass fibre, most preferably polyamide fibres such as Nylon 6,6. They require to be flexible in order to be useful as inflatable bodies. Preferably they are sufficiently
15 flexible to be able to be folded into relatively small volumes, but also sufficiently strong to withstand their deployment at high speed, e.g. under the influence of an explosive charge, the impact of passengers or to be resistant to other influences when inflated.

20 The elastomer forming coating compositions may be applied according to known techniques to the textile fabric substrates. These include spraying, gravure coating, bar coating, coating by knife-over-roller, coating by knife-over-air, padding and screen-printing.
25 It is preferred that the composition is applied by a knife-over-air or knife-over-roller coating method. It is also preferred that the composition is applied to a coat-weight prior to curing of at least 25 g/m². Preferably the coating thickness is from 25 to 150g/m², more preferably 60
30 to 130g/m² for applications where pressure needs to be maintained longer, e.g. in side curtain airbags, or 30 to 50 g/m² for applications where the pressure retention is not so critical over prolonged periods, e.g. in standard driver airbags. In order to make the compositions easily

applicable to the textile fabric, it is preferred that the viscosity of the composition is from 50,000 to 200,000 mm²/s.

Application to the textile fabric of the coating composition may take place under normal conditions, preferably of course the conditions are sufficiently clean to avoid entrapment of foreign bodies during the application. The textile fabric is preferably scoured prior to application, in order to ensure good adhesion of the composition.

Although it is not preferred, it is possible to apply the composition in multiple layers, which together fulfil the preferred criteria set out above. It is also possible to apply onto the coating composition a further coating, e.g. of a material providing low friction, or, even more preferably, an additional textile fabric, whether woven or non-woven, to improve the strength and/or the feel of the fabric.

Curing conditions for the composition are preferably at elevated temperatures over a period which will vary depending on the actual temperature used. Suitable curing conditions for the preferred compositions are 120 to 200°C for a period of up to 5 minutes.

According to a third aspect of the invention there is provided a process for coating textile fabric with a layer of an elastomer-forming coating composition according to the first aspect of the invention and causing the layer to cure to form an elastomeric coating on the fabric.

The advantage of the different aspects of the invention is that without having to combine multiple layers of coating on the surface of a textile fabric the fabric is still very able to form a barrier between areas of differing pressure. Particularly useful applications

for textile fabrics coated according to the present invention are those applications where the fabric is formed into an envelope and pressure is applied inside the envelope, e.g. by introducing gas into the envelope and thus inflating it. Particularly useful applications include automotive airbags, emergency shoots on aeroplanes, hot air balloons. The most valuable use of fabrics according to the invention is in the production of side curtain airbags for automobiles, where the internal pressure of the envelope needs to be maintained for a relatively long period of time, e.g. from 1 to 5 seconds. A specific additional advantage of the different aspects of the invention is that the coating composition provides the combination of very high values of elongation at break and tear strength values, making the composition particularly suitable for use with inflatable devices. It was found that the elongation at break has on average values of at least 400% and tear strength values of at least 30kN/m.

The following examples, where parts and percentages are given in weight, unless otherwise stated and where viscosity is dynamic viscosity at 25°C, illustrate the invention.

Examples

A first composition (I) was prepared by mixing together 52 parts of an α,ω -vinyl dimethylsiloxane end-blocked polydimethylsiloxane having a viscosity of about 55,000mm²/s, 16 parts of an α,ω -vinyl dimethylsiloxane end-blocked polydimethylsiloxane having a viscosity of about 450mm²/s, 7 parts of an vinyl dimethylsiloxane end-blocked polydimethyl, polymethylvinyl siloxane copolymer having a viscosity of about 350mm²/s, 25 parts of a fumed silica which had its surface made hydrophobic and 0.002 parts by

weight of a platinum based catalyst. Composition (I) had a viscosity of 130,000mm²/s.

A second composition (II) was prepared, containing 51 parts by weight of an α,ω -vinyl dimethylsiloxane end-blocked polydimethylsiloxane having a viscosity of 55,000mm²/s, 3 parts of an α,ω -vinyl dimethylsiloxane end-blocked polydimethylsiloxane having a viscosity of about 450mm²/s, 9 parts of an vinyl dimethylsiloxane end-blocked polydimethyl, polymethylvinyl siloxane copolymer having a viscosity of about 350mm²/s, 25 parts by weight of a fumed silica which had its surface made hydrophobic, 12 parts by weight of an methylhydrosiloxane dimethylsiloxane copolymer having trimethylsiloxane end-blocking units, at least 3 silicon-bonded hydrogen atoms per molecule and a viscosity of about 5mm²/s. Composition (II) had a viscosity of 130,000mm²/s.

A first comparative elastomer-forming composition (C1) was prepared by mixing together 70 parts of an α,ω -vinyl dimethylsiloxane end-blocked polydimethylsiloxane having a viscosity of about 2,000mm²/s, 30 parts of a fumed silica which had its surface made hydrophobic and 0.002 parts by weight of a platinum based catalyst. Composition (C1) had a viscosity of 100,000mm²/s.

A second comparative composition (C2) was prepared, containing 64 parts by weight of an α,ω -vinyl dimethylsiloxane end-blocked polydimethylsiloxane having a viscosity of 2,000mm²/s, 26 parts by weight of a fumed silica which had its surface made hydrophobic, 4 parts by weight of an methylhydrosiloxane dimethylsiloxane copolymer having trimethylsiloxane end-blocking units, at least 3 silicon-bonded hydrogen atoms per molecule and a viscosity of about 5mm²/s and 5 parts by weight of a dimethylsiloxane having dimethylhydrosiloxane and-blocking

units and a viscosity of about 10 mm²/s. Composition (C2) had a viscosity of 100,000mm²/s.

A third comparative composition (C3) was prepared containing 64 parts of an α,ω -vinyl dimethylsiloxane end-
5 blocked polydimethylsiloxane having a viscosity of about 55,000mm²/s, 25 parts of a fumed silica which had its surface made hydrophobic, 0.002 parts by weight of a platinum based catalyst, and 9 parts of a dimethylsiloxane methylvinylsiloxane copolymer having vinyl dimethylsiloxane
10 end-blocking units and a viscosity of about 350mm²/s. Composition (C3) had a viscosity of 175,000mm²/s.

A fourth comparative composition (C4) was prepared by mixing together 61 parts of an α,ω -vinyl dimethylsiloxane end-blocked polydimethylsiloxane
15 having a viscosity of about 55,000mm²/s, 25 parts of a fumed silica which had its surface made hydrophobic, 3 parts by weight of an methylhydrogensiloxane dimethylsiloxane copolymer having trimethylsiloxane end-blocking units, at least 3 silicon-bonded hydrogen atoms
20 per molecule and a viscosity of about 5mm²/s and 9 parts of a dimethylsiloxane methylvinylsiloxane copolymer having vinyl dimethylsiloxane end-blocking units and a viscosity of about 350mm²/s. Composition (C4) had a viscosity of 175,000mm²/s.

25 A fifth comparative composition (C5) was prepared by mixing 5 parts of a first composition comprising 64 parts of a 70/30 mixture of a dimethylvinylsiloxyl-terminated polydimethylsiloxane and hydrophobic silica, 26 parts of ground quartz, 4 parts of calcium carbonate and a
30 catalytic amount of a platinum based catalyst and 1 part of a second composition comprising 50 parts of a 70/30 mixture of a dimethylvinylsiloxyl-terminated polydimethylsiloxane and hydrophobic silica, 46 parts of a dimethylsiloxane methylhydrogen siloxane copolymer having

silicon-bonded hydrogen atoms on about 50% of the silicon atoms.

EXAMPLE 1

A double layered polyamide fabric of 470 Dtex was made into A4 sized envelopes coated on both sides of the fabric by a knife over roller technique with a 50/50 elastomer-forming mixture of compositions (I) and (II) to a coat weight of 120g/m², followed by heating the coated fabric for 90 seconds at 150-170°C. After allowing the coated fabric to cool to room temperature, a coated fabric was obtained having a silicone-based coat.

The fabric was then inflated with air under explosive conditions to a pressure of 220 kPa. The pressure in the sealed envelope was then measured after 5 seconds and after 10 seconds. Details of the test results are given below in Table I. Also were measured tear strength and elongation at break of a self-supported film of the cured coating composition. Results are also given in Table 1.

COMPARATIVE EXAMPLES C1-C5

All examples were carried out according to the process of Example 1. Comparative Example CE1 used a 50/50 mixture of Comparative compositions C1 and C2; Test results are also given in Table I below.

TABLE I

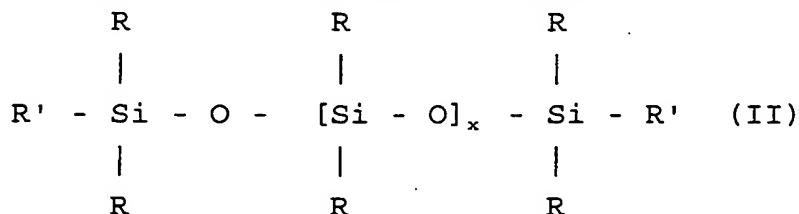
Example	Residual pressure after 5 seconds	Residual pressure after 105 seconds	Tear Strength kN/m	Elongation at break
1	180 kPa	70150 kPa	40	600%
CE1	140 kPa	70 kPaN/D	15	600%
CE2	130 kPa	70 kPaN/D	45	250%
CE3	110 kPa	50 kPaN/D	10	150%

Claims

1. A coating composition for textile fabrics, which is curable to an elastomeric finish, which comprises a first, second and third organopolysiloxane having aliphatically unsaturated hydrocarbon or hydrocarbonoxy substituents, an organosilicon crosslinker having at least 3 silicon-bonded hydrogen atoms, a catalyst able to promote the reaction of the aliphatically unsaturated hydrocarbon or hydrocarbonoxy substituents with Si-H groups and a reinforcing filler, wherein the first and second organopolysiloxanes have aliphatically unsaturated hydrocarbon or hydrocarbonoxy substituents only at the terminal siloxane units, the first organopolysiloxane having a viscosity at 25°C of from 50 to 650 mm²/s, the second organopolysiloxane having a viscosity at 25°C of at least 10,000 mm²/s and wherein the third organopolysiloxane has aliphatically unsaturated hydrocarbon or hydrocarbonoxy substituents at terminal siloxane units and on siloxane units in the siloxane polymer chain.

2. A coating composition according to Claim 1, wherein the organopolysiloxanes comprise units of the general formula $R_aR'_bSiO_{4-a-b/2}$ (I), wherein R is a monovalent hydrocarbon group having up to 18 carbon atoms, R' is a monovalent hydrocarbon or hydrocarbonoxy group having aliphatic unsaturation, a and b have a value of from 0 to 3, the sum of a+b being no more than 3.

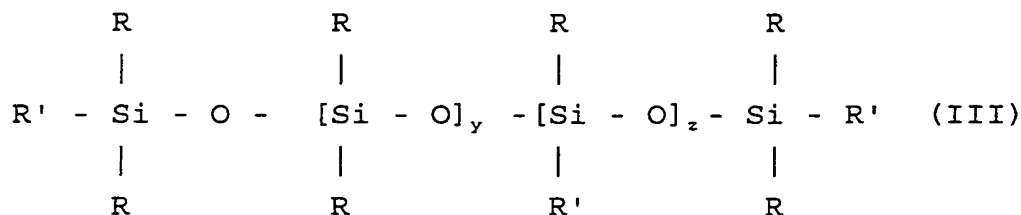
3. A coating composition according to Claim 1 or 2, wherein the first and second organosiloxane polymers are of a generally linear nature having the general structure (II)



wherein R and R' have the same meaning as above, and wherein x is an integer with a value of up to 200 for the first organopolysiloxane and having a value of at least 300 for the second organopolysiloxane.

4. A coating composition according to any of the preceding claims, wherein the first organopolysiloxane is an α,ω -vinyl dimethylsiloxypolydimethylsiloxane polymer having a viscosity of from 50 to 650 mm²/s at 25°C, and wherein the second organopolysiloxane is an α,ω -vinyl dimethylsiloxypolydimethylsiloxane polymer having a viscosity of from 10,000 to 90,000 mm²/s at 25°C.

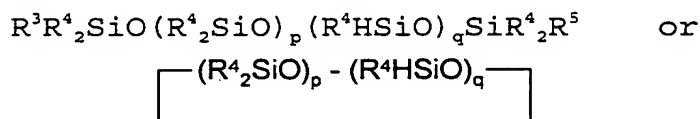
5. A coating composition according to any of the preceding claims, wherein the third organosiloxane polymer is of a generally linear nature having the general structure (III)



wherein R and R' have the same meaning as above, and wherein y is zero or an integer and z has a value of at least 1, while the value of y+z is no more than 300.

6. A coating composition according to any of the preceding claims, wherein the first and second organopolysiloxane are present in a weight ratio of from 1 to 2 to 1 to 20, the second and third organopolysiloxanes in a weight ratio of from 20 to 1 to 2 to 1.

7. A coating composition according to any of the preceding claims, wherein the organosilicon cross-linker has the general formula



wherein R^4 denotes an alkyl or aryl group having up to 10 carbon atoms, R^3 is a group R^4 or a hydrogen atom, p has a value of from 0 to 20, q has a value of from 1 to 70, and there are at least 3 silicon-bonded hydrogen atoms present per molecule.

8. A coating composition according to any of the preceding claims, which comprises a catalyst, selected from those based on Group VIII metals, including ruthenium, rhodium, palladium, osmium, iridium and platinum.

9. A coating composition according to Claim 8, wherein the catalyst selected from chloroplatinic acid, platinum acetylacetonate, complexes of platinous halides with unsaturated compounds.

10. A coating composition according to any of the preceding claims, wherein the reinforcing filler is selected from silica, titania and glass microspheres.

11. A coating composition according to any of the preceding claims, comprising (a) 100 parts by weight of a first organopolysiloxane material having only terminal silicon-bonded aliphatically unsaturated hydrocarbon groups per molecule and a viscosity at 25°C of from 50 to 650 mm²/s; (b) from 300 to 700 parts by weight of a second organopolysiloxane material having only terminal silicon-bonded aliphatically unsaturated hydrocarbon groups per molecule and a viscosity at 25°C of at least 10,000 mm²/s; (c) from 50 to 150 parts by weight of a third organopolysiloxane material having has aliphatically unsaturated hydrocarbon substituents at terminal siloxane units and on units in the polymer chain per molecule; (d) an organosilicon compound having at least three silicon-bonded hydrogen atoms per molecule, in an amount which is suffiscent to give a molar ratio of Si-H groups in (d) to alkenyl groups in (a), (b) and (c) combined of from 5/1 to 10/1; (e) a group VIII based catalyst component in sufficient amounts to catalyse the addition reaction between (a), (b) and (c) on the one hand and (d) on the other; (e) from 100 to 400 parts by weight of a hydrophobic filler.

12. A coated textile fabric comprising a textile fabric coated with an elastomer-forming composition according to any of the preceding claims, which has been allowed to cure to an elastomeric finish.

13. A coated textile fabric according to Claim 12, wherein the fabric is made from polyamide fibres.

14. A process for making a coated textile fabric, which comprises coating a textile fabric with a layer of an elastomer-forming coating composition according to any of Claims 1 to 11 and causing the layer to cure to form an elastomeric coating on the fabric.

15. A process according to Claim 14, wherein the coating composition is applied by spraying, gravure coating, bar coating, coating by knife-over-roller, coating by knife-over-air, padding or screen-printing.

16. A process according to Claim 14 or 15, wherein the composition is applied to a coat-weight prior to curing of at least 25 g/m².

17. A process according to any of Claim 14 to 16, wherein the composition is cured at a temperature of from 120 to 200°C for a period of up to 5 minutes.